From: **Richard Albores/DC/USEPA/US**
Sent: 9/20/2011 9:38:51 AM

To: Bernadette Rappold/DC/USEPA/US@EPA
CC: Andrew Stewart/DC/USEPA/US@EPA
Subject: Re: Fw: ProPublica: Science Lags as Health Problems Emerge Near Gas Fields

Bern - thanks for this. in the interest of making sure everyone gets information like this "sametime" could you just send the link to me and i will circulate to the entire team...

R
~~~~~
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From: Bernadette Rappold/DC/USEPA/US
To: James Kenney/DC/USEPA/US@EPA, Richard Albores/DC/USEPA/US@EPA, Shannon Griffo/DC/USEPA/US@EPA, Tim Sullivan/DC/USEPA/US@EPA, Sanda Howland/DC/USEPA/US@EPA, Ben Larson/DC/USEPA/US@EPA
Cc: Andrew Stewart/DC/USEPA/US@EPA
Date: 09/19/2011 06:33 PM
Subject: Fw: ProPublica: Science Lags as Health Problems Emerge Near Gas Fields

FYI.

- b

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----- Forwarded by Bernadette Rappold/DC/USEPA/US on 09/19/2011 06:33 PM -----

From: Ayn Schmit/R8/USEPA/US
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Date: 09/19/2011 05:05 PM
Subject: Fw: ProPublica: Science Lags as Health Problems Emerge Near Gas Fields

Abrahm Lustgarten has followed the Pavillion story fairly closely

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Date: 09/19/2011 11:41 AM
Subject: ProPublica: Science Lags as Health Problems Emerge Near Gas Fields

FYI. Extensive references to Pavillion, Wyo., Garfield County Colorado, etc.

# Science Lags as Health Problems Emerge Near Gas Fields


DIM0262111
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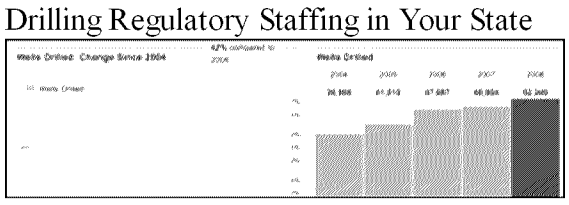
Susan Wallace-Babb, wearing the oxygen mask she has to wear almost every day outside, walks with her dog at home in Winnsboro, Texas, on Sept. 12, 2011. (Erin Trieb for ProPublica)

by Abrahm Lustgarten and Nicholas Kusnetz
ProPublica, Sep. 16, 2011, 5:35 p.m.

On a summer evening in June 2005, Susan Wallace-Babb went out into a neighbor's field near her ranch in Western Colorado to close an irrigation ditch. She parked down the rutted double-track, stepped out of her truck into the low-slung sun, took a deep breath and collapsed, unconscious.

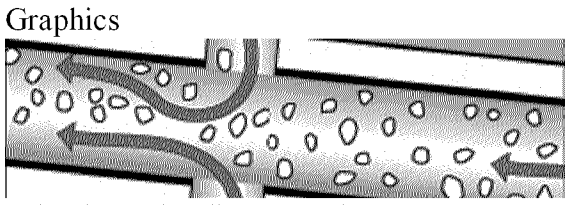
A natural gas well and a pair of fuel storage tanks sat less than a half-mile away. Later, after Wallace-Babb came to and sought answers, a sheriff's deputy told her that a tank full of gas condensate liquid hydrocarbons gathered from the production process had overflowed into another tank. The fumes must have drifted toward the field where she was working, he suggested.

Drilling Regulatory Staffing in Your State

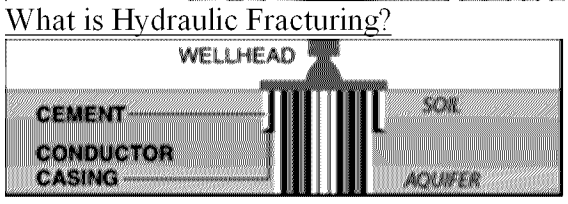


Search for how many wells have been drilled and how many gas regulators are in your state.

Graphics



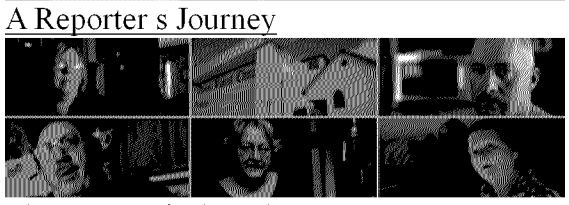
What is Hydraulic Fracturing?



Anatomy of a Gas Well

Slideshows

A Reporter s Journey



The Faces of Dimock

Video

Fracking: The Music Video

The next morning Wallace-Babb was so sick she could barely move. She vomited uncontrollably and suffered explosive diarrhea. A searing pain shot up her thigh. Within days she developed burning rashes that covered her exposed skin, then lesions. As weeks passed, anytime she went outdoors, her symptoms worsened. Wallace-Babb's doctor began to suspect she had been poisoned.

"I took to wearing a respirator and swim goggles outside to tend to my animals," Wallace-Babb said. "I closed up my house and got an air conditioner that would just recycle the air and not let any fresh air in."

Wallace-Babb's symptoms mirror those reported by a handful of others living near her ranch in Parachute, Colo., and by dozens of residents of communities across the country that have seen the most extensive natural gas drilling. Hydraulic fracturing [1], along with other processes used to drill wells, generates emissions and millions of gallons of hazardous waste that are dumped into open-air pits. The pits have been shown to leak into

groundwater and also give off chemical emissions as the fluids evaporate. Residents' most common complaints are respiratory infections, headaches, neurological impairment, nausea and skin rashes. More rarely, they have reported more serious effects, from miscarriages and tumors to benzene poisoning and cancer.

ProPublica examined government environmental reports and private lawsuits and interviewed scores of residents, physicians and toxicologists in four states Colorado, Texas, Wyoming and Pennsylvania that are drilling hot spots. Our review showed that cases like Wallace-Babb's go back a decade in parts of Colorado and Wyoming, where drilling has taken place for years. They are just beginning to emerge in Pennsylvania, where the Marcellus Shale drilling boom began in earnest in 2008.

Concern about such health complaints is longstanding Congress held hearings on them in 2007 at which Wallace-Babb testified. But the extent and cause of the problems remains unknown. Neither states nor the federal government have systematically tracked reports from people like Wallace-Babb, or comprehensively investigated how drilling affects human health.

"In some communities it has been a disaster," said Christopher Portier, director of the U.S. Agency for Toxic Substances and Disease Registry (ATSDR) and the National Center for Environmental Health. "We do not have enough information on hand to be able to draw good solid conclusions about whether this is a public health risk as a whole."

Exemptions from federal environmental rules won by the drilling companies have complicated efforts to gather pollution data and to understand the root of health complaints. Current law allows oil and gas companies not to report toxic emissions and hazardous waste released by all but their largest facilities, excluding hundreds of thousands of wells and small plants. Many of the chemicals used in fracking and drilling remain secret [2], hobbling investigators trying to determine the source of contamination. The gas industry itself has been less than enthusiastic [3] about health studies. Drillers declined to cooperate with a long-term study of the health effects of gas drilling near Wallace-Babb's town this summer, prompting state officials to drop their plans and start over.

These factors make a difficult epidemiological challenge even tougher. Doctors and toxicologists say symptoms reported by people working or living near the gas fields are often transient and irregular. They say they need precise data on the prevalence and onset of medical conditions, as well as from air and water sampling, to properly assess the hazards of drilling.

"There are considerable issues about health effects," said John Deutch, former director of the CIA and a professor of chemistry at MIT, who heads a Department of Energy panel examining the environmental effects of shale gas drilling, with an emphasis on hydraulic fracturing. "Frankly, I'm not even sure ... what serious public health work has been done in making a connection."

The health questions are intensifying at a moment when communities and states are already weighing the benefits and costs of drilling for natural gas. Drilling has brought much-needed jobs and cash infusions to some of the nation's poorer regions; bullish estimates of U.S. gas reserves promise plenty of drilling development in the future. At the same time, fracking's lasting environmental toll particularly the threat it may pose to water supplies has become the subject of intense debate. Since 2008, ProPublica has reported [4] about hundreds of cases of water contamination [5] in more than six states where drilling and fracking are taking place as well as the difficulties of handling the vast quantities of waste [6] the drilling processes produce.

Medical and government groups are beginning to sound alarms about drilling's potential to damage health.

In May, Sen. Robert Casey Jr., D-Pa., wrote to Environmental Protection Agency administrator Lisa Jackson, the Centers for Disease Control and Prevention and state officials, asking them to investigate illness clusters in Pennsylvania. "Despite being above the normal rate, these disease groupings are often dismissed as statistically insignificant," Casey wrote.

In July, when the EPA proposed new emissions [7] rules for the drilling industry, it warned that without them there could be an unacceptably high risk of cancer for people living close to major facilities. In August, a national association of childrens' doctors published a fact sheet detailing concerns [8] about fracking and warning that children are more susceptible to chemical exposure. The group called for more epidemiological research and disclosure of chemicals used in drilling.

The gas drilling industry says it supports such research and that health concerns should be taken seriously, but that the public should be careful of jumping to conclusions. "Sound science does exist on these issues," wrote Chris Tucker, a spokesman for the industry group Energy in Depth, in an email. Tucker pointed to a case in Pennsylvania where a woman alleged that drilling had contaminated her water and made her sick. A state investigation found that her water was indeed foul, but that it had been that way long before drilling began. "Eventually, pretty firm conclusions can be made with respect to potential causes and effects. Unfortunately, it takes time to do all that in a rigorous, data-driven way."

No such research is under way on a significant scale, however.

Portier, whose agency is a sister agency of the CDC and charged with determining the toxicity of industrial chemicals and preventing exposure to them, says the anecdotal evidence of environmental illness is sufficient to warrant a more serious and systematic approach to studying it. His agency, in conjunction with the EPA, is performing at least five health consultations for communities concerned about health impacts, including two in Pennsylvania. These smaller-scale studies assess health risks based on data already collected, giving a snapshot of a community at a particular moment. But what's needed is a nationwide study that tracks people living close to drilling over time, Portier said. That could cost upward of $100 million. "We can't do everything yet," Portier said. "We only have so much money available."

* * *

Well tanks are seen in the background in Pavillion, Wyo. (Abrahm Lustgarten/ProPublica)

The number of new natural gas wells drilled each year in the United States has skyrocketed, from 17,500 in 2000 to a peak of more than 33,000 in 2008. Fracking technology, once used in just a small percentage of wells, has made it possible to get gas out of deeply buried reserves and has become an

essential part of drilling almost every new well. At the same time, fracking has opened up vast new reserves in the eastern United States. The wells are now being drilled in heavily populated parts of Louisiana, Pennsylvania and Colorado, and even into urban neighborhoods of Fort Worth.

Alongside the growth in drilling, reports of fouled water, bad odors and health complaints also have increased. In the few places where basic environmental sampling has been done, the results confirm that water and air pollution are present in the same regions where residents say they are getting sick. Last spring, the EPA doubled its estimates [9] of methane gas leaked from drilling equipment and said the amount of methane pollution that billows from fracking operations was 9,000 times higher than researchers had previously thought.

In Colorado, the ATSDR sampled air for pollutants at 14 sites for a 2008 report [10], including on Susan Wallace-Babb's property. Fifteen contaminants were detected at levels the federal government considers above normal. Among them were the carcinogens benzene, tetrachloroethene and 1,4-dichlorobenzene. The contamination fell below the thresholds for unacceptable cancer risk, but the agency called it cause for concern and suggested that as drilling continued, it could present a possible cancer risk in the future. Even at the time of the sampling, the agency reported, residents could be exposed to large doses of contaminants for brief "peak" periods.

"Since residents may be repeatedly exposed to these peak concentrations of benzene," the ATSDR report said, "the concentrations ... warrant careful monitoring and exposure evaluation."

In Pavillion, Wyo. [11], where residents have complained of nerve damage and loss of sense of taste and smell, EPA superfund investigators found benzene and other hydrocarbons in well water samples, as well as methane gas, metals, and an unusual chemical variant of a compound used in hydraulic fracturing. A health survey conducted there by an environmental group [12] in late 2010 found that 94 percent of respondents complained of health issues they thought were new or connected to the drilling, and 81 percent reported respiratory troubles. The ATSDR, in consultation with the EPA, advised at least 19 families in Pavillion not to drink their water and to ventilate bathrooms when they bathed, in part because volatile organic compounds can become airborne in a shower. But the government stopped short of saying that drilling caused the contamination or their symptoms.

In 2009, an environmental-sciences firm also found widespread air contaminants in Dish, Texas [13], a small town in the heart of the Barnett Shale just north of Fort Worth. Wolf Eagle Environmental, hired by the town's mayor and local residents, collected readings from seven monitoring stations [14] and detected 16 chemicals, including benzene and other known and suspected carcinogens. Benzene exceeded Texas' exposure standards at three of the stations.

Wilma Subra, the environmental consultant who ran the survey in Pavillion, also surveyed Dish residents about their health. About 60 percent of respondents reported symptoms that would be expected in people exposed to high levels of the chemicals found in the air samples, Subra said.

Texas' Commission on Environmental Quality reviewed Wolf Eagle's work and agreed that the contaminants could pose [15] a long-term health risk to residents. This year, it followed up with air monitoring of its own in nearby Fort Worth. While the agency determined that contamination levels did not present a public health risk, emissions at five test sites violated state regulatory guidelines. The state documented high levels of benzene and formaldehyde both carcinogens in those spots.

"Evidence like that really gives our agency a bit of urgency in its work," said Al Armendariz, the EPA's regional administrator for south central states, based in Texas.

* * *

One of the byproducts of the natural gas boom has been that environmental agencies set up to handle issues of permitting and waste disposal are grappling with questions of health and epidemiology, subjects in which they have little training or experience.

In Pennsylvania and Colorado, regulators are still taking the first awkward steps toward developing processes to track and investigate reports of illness related to drilling.

Pennsylvania's Department of Environmental Protection [16] has received 1,306 drilling-related complaints since 2009 45 percent of which alleged water pollution but officials acknowledged they couldn't separate out how many involved health issues. Officials with the state Department of Health said they coordinated with the DEP on drilling-related health complaints but would not respond to questions for this story and denied ProPublica's request for complaint records, citing privacy concerns.

Pennsylvania's secretary of health has urged the creation of a registry to track health complaints in the state's drilling areas at an annual cost of about $2 million but so far, the governor has not acted upon the recommendation.

Records show Colorado's Oil and Gas Conservation Commission received 496 complaints between mid-2006 and the end of 2008. But officials there, much like their Pennsylvania counterparts, have no way to separate those related to health even the ones passed on by the state Department of Public Health and Environment from those concerning spills, or noise, or other disruptions.

In an internal government report, the commission separated out complaints related to odors for this period. There were 121. But there are limited public records reflecting what state officials did in response to these reports. Often, records show state officials pursued or fixed the source of an odor, but not whether they tracked any possible health effects connected to the odors.

"Those are allegations, they're complaints, they may or may not be valid complaints," said Debbie Baldwin, the commission's environmental manager. "Given the number of people in the state, the number of wells in the state and the amount of activity associated with oil and gas ... that's a small number."

It is unclear from available records whether the commission ever independently evaluated Susan Wallace-Babb's assertion that toxic emissions harmed her health. The agency's report shows that inspectors confirmed her story about an overflow and fumes and asked Williams, the company drilling near her home, whether dangerous pollutants had been emitted. The company said no, assuring inspectors "this is a non-incident," records show. In the segment of the incident report labeled "resolution," the agency also noted that the company suspected Wallace-Babb "may have been influenced by others annoyed with local gas-field operators."

In response to a request for comment, Williams referred ProPublica to a letter it submitted to the U.S. House Oversight and Government Reform committee after Wallace-Babb testified in 2007. In the letter, the company says that it placed a cap on an open tank near Wallace-Babb's home and conducted its own air monitoring for pollutants that would post a health risk, finding none. State and federal air monitoring also did not find levels of emissions that would clearly pose a health risk, the company said. "We had employees or contractors at the well site on a regular basis and none of them ever complained about feeling sick as a result of being near the tank," Williams letter states.

Colorado's health department responded to questions by email about how the state tracks health complaints from people in drilling areas. The department's spokesman said the state had insufficient data to show a relationship between drilling and health issues. "There continues to be much interest in the potential health effects of gas production activities," wrote Mark Salley. "This department will continue to work with the Colorado Oil and Gas Conservation Commission to protect the public's health."

* * *

Susan Wallace-Babb sits in her bedroom, where she keeps her green oxygen tank for when she has a major flare-up that can leave her bedridden. (Erin Trieb for ProPublica)

In September 2009, Range Resources began drilling a natural gas well near the home of Beth Voyles in one of the most heavily drilled counties in southwestern Pennsylvania. The following spring, Range began filling a giant waste impoundment near Voyles' home, and wastewater accumulated in puddles on the dirt roads, where the water was sprayed to hold down the dust, according to a lawsuit Voyles filed against the state and interviews with ProPublica. The family immediately noticed a stench, and its dog, which lapped the fluid from the puddles, got sick.

A veterinarian determined that the dog had been exposed to ethylene glycol, a component of antifreeze that is also used in hydraulic fracturing. The dog's organs began to crystalize, and ultimately failed, the vet told Voyles, and the family had to euthanize the dog. A short time later the family had to euthanize a horse after it exhibited similar symptoms, Voyles told ProPublica. "If it's crystalizing their organs," Voyles said of her animals, "just how long before it's going to do that to us?" Then the whole family started getting rashes, aches and blisters in their noses and throats. Her doctors couldn't pinpoint what was causing their symptoms.

"You feel like you're drugged because your brain's not thinking," she said. "We want our life back."

When Voyles began to suspect drilling might be the cause, she had her doctors run blood tests for chemicals known to be used in the processes. The results came back showing high levels of benzene, toluene and arsenic.

In August 2010, after several complaints from the area, according to Voyles' lawsuit, the state Department of Environmental Protection asked Range to treat the impoundment pond for hydrogen sulfide, a toxic gas that can be fatal at high levels and cause nausea, vomiting and headaches in lower amounts. The impoundment was briefly emptied in June, Voyles said, but then filled again in August. Now the rashes are back, she's lost much of her sense of smell and she says everything tastes like metal.

Voyles is suing the DEP, which she says ignored her concerns that the chemicals in her blood could be from the waste in the impoundment nearby, never advised her that its tests showed that her well water was also contaminated with an industrial solvent and never issued any violations to Range. Among the clear violations that DEP overlooked, she alleges, was that the waste impoundment did not meet minimum state regulatory requirements. Her lawsuit does not seek compensation, but asks that the agency investigate her complaints according to state regulations. The DEP did not respond to calls requesting comment.

Range Resources did not respond to a call from ProPublica about Voyles' case either. In an earlier report, the company denied there were problems with the impoundment near her home.

After seeing several medical specialists and epidemiologists, Voyles still doesn't know what to do about her family's health.

"They don't know how to treat us," she said.

* * *

In assessing Voyles' case and others like it, environmental epidemiologists warn that proximity and correlation don't add up to proof. Even when symptoms and contamination occur in the same place, they say, it doesn't necessarily mean the contamination caused the symptoms.

"You have a community where there is a putative exposure, and a community with putative illness," said Daniel Teitelbaum, a toxicologist who has spent years examining health issues around drilling and helped frame some of the early research in Colorado. "But you can't say whether the people exposed are the people who are ill."

In the Pennsylvania case pointed out by industry spokesman Chris Tucker, for example, a woman complained for years of symptoms similar to Wallace-Babb's. She alleged that drilling activities had contaminated her water with barium. She spoke at anti-drilling rallies and environmental groups used her case. But when Pennsylvania officials investigated, they found her intense exposure to barium hadn't come from drilling it was a natural seepage into her well.

Teitelbaum says that collecting measurements of contaminants in the air and water is an essential first step. But he said epidemiologists then set out to track an "exposure pathway," comparing people exposed to pollutants to people not exposed and then identifying how the exposure occurred. No such scientific protocol has been developed to examine the gas fields. Without one, the more common respiratory and skin ailments are increasingly accepted as being related to pollution, Teitelbaum said. But whether the more serious symptoms have anything to do with drilling is a complete unknown. "You hear and see everything you can possibly imagine, from miscarriages to multiple sclerosis to brain tumors," he said. "There is no way to document whether those things are real or not real."

That's why a health registry a database to cross reference patterns of symptoms and locations where they occur with water and air tests is so important, he said. Without this context, complaints from residents may not be taken seriously by doctors or environment officials, partly because people respond to chemical exposures differently. Their symptoms can vary widely and can be difficult to recognize.

"If someone comes in and just says I can't think straight, or I'm really tired or I have headaches, that's not measureable," said Dr. Kendall Gerdes, a Denver-based physician who specializes in ecological exposure cases and has seen a number of patients complaining about the gas patch. "Therefore it's considered psychosomatic by most doctors' training."

Gerdes said many of the symptoms roughly fit what ecological-disorder specialists in ecological disorders call multiple chemical sensitivity. It's a sort of catch-all to explain intense reactions to chemical compounds ranging from skin maladies to nerve damage.

According to Gerdes, those predisposed to chemical sensitivity are likely to have the most pronounced reactions to chemical exposures in drilling areas. "Characteristically that person will know they can't be around fresh paint, or can't wear perfume," he said. "So to me, it is an unrecognized vulnerability that, when put together with significant exposures, is enough to cause troubles."

The more people with chemical sensitivity are exposed, the more sensitized they get, Gerdes said. Before Susan Wallace-Babb passed out in the field by her truck, she had felt wooziness and headaches. In the weeks after, she couldn't bear the slightest exposure in places where she had previously felt safe.

"I would wake up in the middle of the night in pain and vomiting and so sick I could barely make it to the bathroom," she said. "And that was with the house closed."

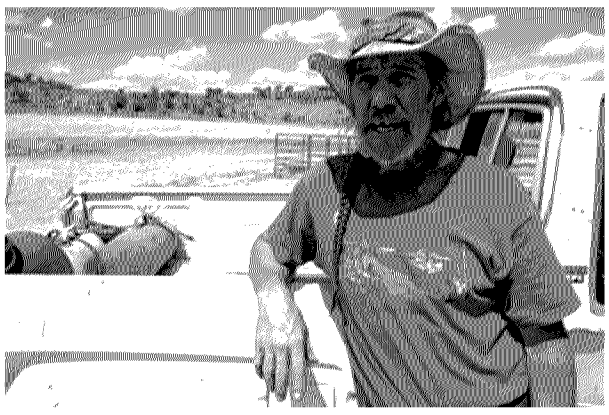
Gerdes and others experts say that whatever affected Susan Wallace-Babb likely also affected others in her community, but they may not have exhibited the same symptoms or reacted as quickly.

For all the mysteries surrounding Wallace-Babb's condition, one thing was clear: When she was away from home, she felt better. When she returned, her symptoms worsened. "That's probably the clearest association you can make," Gerdes said. "When it happens several different times there is a correlation."

Wallace-Babb reluctantly decided to move.

"My body could not rid itself of the toxins," Wallace-Babb said. Her doctor warned her that if she didn't leave, she would never get better. "I thought gosh, there is my dream house. There is my dream all gone and what am I going to do?"

* * *



Rick Roles, a rancher in Garfield County, Colo., whose property is dotted with gas wells and used to be near a set of waste pits, told ProPublica in 2008 that his eyes and throat burned relentlessly and that he was experiencing intense fatigue. (Abrahm Lustgarten/ProPublica)

By late 2009, stories like Wallace-Babb's had become common in Garfield County, Colo., where she had lived and the natural gas production had jumped eightfold in the previous eight years.

Rick Roles, whose ranch is dotted with gas wells and used to be near a set of large open-air waste pits, complained of intense fatigue. His eyes and throat burned relentlessly, he told ProPublica during a visit in 2008. Light work made his heart race, and, like in the case of Voyles, doctors detected benzene in his blood. Roles was a smoker, which could explain the benzene. But he also raised goats with prized bucks, and after the wells were drilled, many of the kids were stillborn or deformed.

A few miles away another woman, Laura Amos, was diagnosed with a rare adrenal tumor she believed was caused by drilling chemicals that are used in fracking. In 2001, her water well exploded with methane and gray sediment the same day drillers pumped fluids underground to frack a well nearby. By 2003 she was sick. After her lawyers obtained documents from the drilling company, EnCana, showing that the suspected chemical was used in nearby wells, Amos accepted a multimillion-dollar settlement. The terms remain confidential, except for the fact that Amos is no longer allowed to talk about her case. Colorado fined EnCana for failing to contain its drilling waste properly. EnCana has said it disagreed with the state action and that there was no proof that fracking caused Amos' well problems.

Another local couple, the Mobaldis, experienced symptoms similar to those of Wallace-Babb and Voyles, but worse. Steve Mobaldi testified about his wife's condition at a 2007 congressional hearing. "Chris began to experience fatigue, headaches, hand numbness, bloody stools, rashes, and welts on her skin," he said. "Tiny blisters covered her entire body. The blisters would weep, then her skin would peel. ... Canker-type sores appeared in her mouth and down her throat, and they would disappear the next day. ... The racking pain was unbearable."

Chris Mobaldi developed a pituitary tumor and died in 2010 from a complication in her treatment.

In response to these cases and others, state and county health officials conducted a series of monitoring projects that found that gas drilling was the area's largest source of several hazardous air pollutants, including benzene and ozone-forming emissions. For several years, with the cooperation of federal health officials, Colorado monitored air quality in Garfield County, determining repeatedly that while pollution in the area did not exceed health standards, it probably meant there was a slightly elevated risk of cancer and other health effects. But none of those steps were sufficient to help officials determine the precise risk level. They didn't have a way to systematically record health complaints or to track which residents might have been exposed to which pollutants and when the essential link in completing an epidemiological study.

Still, the incremental studies underscored concern among residents.

When Antero Resources announced plans in the spring of 2009 to drill 200 more wells in Battlement Mesa, a golf-course community almost within sight of Wallace-Babb's old home, about 400 residents petitioned the county to study the potential health impacts before they permitted the drilling.

In February 2010, the Garfield County board of commissioners hired researchers at the Colorado School of Public Health to conduct another health impact assessment [17], analyzing air samples collected by federal and state officials over the years to gauge the dangers of new drilling and how best to mitigate them. Whereas previous research had analyzed samples of emissions from sites across the county, this time researchers focused on the risk to one small, well-defined area, trying to assess the potential of risk increasing over time. The researchers also were tasked with designing a long-term plan to collect data on the drilling once it began, tracing how emissions affected residents. The two-pronged effort promised to be one of the most in-depth analyses so far of gas field health effects in the nation.

In a draft of the health impact assessment released in February 2011, the School of Public Health researchers concluded that without pollution control measures, emissions from drilling would likely be high enough to cause disease in Battlement Mesa, including respiratory and neurological problems, birth defects and cancer. The report said that air pollution was a greater risk than water pollution and pointed to fracking as the stage of drilling that released some of the most toxic emissions. The conclusion was starkly different from past government assessments, which were limited to determining whether pollution was dangerous at the time the samples were taken. The School of Public Health's view was that the drilling was clearly emitting carcinogens and that sooner or later this would lead to problems, according to Roxana Witter, an assistant research professor at the Colorado School of Public Health and the lead author of the study.

The authors stressed that data from the long-term monitoring phase of their research were needed to fill crucial gaps in evaluating the risks from drilling emissions, but the project wouldn't get that far.

The draft findings were immediately controversial.

"It got political," said John Martin, one of the Garfield County commissioners who oversaw the study. Martin said environmental groups wanted to use the study to stop drilling. "It got blown completely out of proportion and they took advantage of that issue to further their agenda."

The drilling industry was highly critical of the draft and its authors and pressed county officials to delay issuing its final report by extending the period for public comments. Money from outside interest groups had been flowing into elections for Garfield County commission seats, and in November 2010 a commissioner seen as a supporter of more health research was defeated.

In May, the commission decided not to extend the researchers' contract, and a final draft of the report was never produced, limiting the impact of its conclusions.

"The study wasn't finalized," said David Neslin, director of the Colorado Oil and Gas Conservation Commission. "We always have to be careful about using draft documents which haven't been finalized."

Martin, one of the commissioners who voted against paying to finish the project, said the commissioners had already gotten what they were looking for: general recommendations for how to mitigate potential health effects. If there are larger uncertainties about how drilling can affect public health, Martin said, that's for state and federal agencies to study.

"We have limitations and this is beyond the scope of what we need to be doing," he said.

For the next phase of the study the long-term monitoring project the county and the School of Public Health sought the help of Colorado's health department. The department had planned to apply to the EPA for funding to measure drilling emissions and track their movement as drilling progressed.

But in August, local gas drilling companies informed government officials they would not cooperate with the study unless Garfield County and the state agreed to replace Witter's team with other academic researchers and start over.

"GarCO operators have collectively decided a Garfield County air study, conducted by the Colorado Public School of Health [sic], is unworkable and one they are unable to participate in moving forward," wrote David Ludlam, executive director of the West Slope Colorado Oil & Gas Association, in an Aug. 3 email that was forwarded to the Colorado Department of Public Health and Environment.

Antero did not respond to requests for comment. In an email to ProPublica, Ludlam explained the industry wanted to see a scientific organization like Colorado State University's Department of Atmospheric Science do the work, rather than Witter. "It is less about a tangible bias and more about an overall environment of distrust in Garfield County resulting from their previous work product being politicized by outside parties," he wrote.

The state health department abandoned, for the time being, its plans for the research one week after receiving Ludlam's email, withdrawing its application for federal funding.

The project's demise has left the state's leading environmental doctors discouraged. "It is tragic," said Teitelbaum. "We are going lickety split ahead with the drilling along the East Coast and nobody knows what the hell is going on. And nobody wants to spend any money on it."

While Teitelbaum and others wait for answers, Wallace-Babb continues to grapple with the ailments that drove her from Colorado.

In 2006, she moved to Winnsboro, Texas, a small town two hours east of Dallas. For three years her symptoms gradually improved, until she could work in her garden and go about her normal daily routine. Then, early last year, Exxon launched a project in an old oil field 14 miles away and began fracking wells to get them to produce more oil. Within months, Wallace-Babb's symptoms returned. Again, she wears a respirator to visit the grocery store. Again, she is looking to move.

"It's one thing if you choose to work for that industry and you get damaged from that exposure," Wallace-Babb said. "At least they made money. But if you are just living and minding your own business and your life gets torn asunder, it's different.

"I made nothing. I got all the damage."

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